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Report Summary:

nlights	<u>January 1, 2018</u>	<u>January 1, 2020</u>	
<u>Contributions</u>			
Funding Schedule FY 2021	\$13,171,069	\$13,171,069	
Funding Schedule FY 2022	13,648,821	14,224,754	
Funded Ratios			
GAS No. 25	52.3%	49.3%	
<u>Participants</u>			
Actives	853	846	
Retirees and Beneficiaries	718	711	
Inactives	118	121	
Disabled	<u>65</u>	<u>61</u>	
Total	1,754	1,739	
Payroll Payroll			
Payroll of Active Members	\$46,752,291	\$50,322,230	
Average Payroll	54,809	59,483	
Normal Cost			
Employer	\$1,009,209	\$1,172,279	
Employee	4,120,037	4,479,767	
Administrative Expenses	225,000	240,000	
Total	\$5,354,246	\$5,892,046	
Actuarial Accrued Liabilities			
Actives	\$125,330,064	\$142,995,333	
Retirees, Beneficiaries, Disabilities and Inactives	163,964,959	191,230,575	
Total	\$289,295,023	\$334,225,908	
Actuarial Value of Assets	151,232,387	164,889,315	
Unfunded Actuarial Accrued Liabilities	\$138,062,636	\$169,336,593	

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2020, of Peabody Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2020.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Peabody Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2020.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The
 cost of these benefits has been assumed by the State under Proposition Two and
 One-Half.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last year, based on the 2018 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability increased by 7.84% to \$148,883,464. The increase is the result of net unfavorable actuarial experience during the preceding years. The sources of actuarial (gains) and losses are as follows:

Assets	3,922,762
Retirements	(2,288,427)
Terminations	1,049,936
Death while active	(215,378)
Disabled while active	(1,422,582)
Salary	4,860,455
New Participants	1,501,477
Inactive Mortality and data	7,618,972
Benefit Payments	1,526,971
Other	<u>289,946</u>
Total (Gain) / Loss	16,836,302

During the past two years the City increased the COLA base to \$15,000. This added \$25,338 to the Normal Cost and \$1,035,672 to the Unfunded Actuarial Accrued Liability. The assumed mortality was changed to the Society of Actuaries Pub-2010 tables for General, Public Safety, Disabled and Survivors of public plans. This change increased the Normal Cost by \$111,269 and the Unfunded Actuarial Accrued Liability by \$19,965,314.

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Actuarial Costs and Liabilities:

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

Ta	ble I	
	<u>January 1, 2018</u>	January 1, 2020
Superannuation	\$2,844,018	\$3,317,125
Termination	1,365,003	1,447,944
Death	289,897	197,233
Disability	630,328	689,744
Administrative Expenses	<u>\$225,000</u>	<u>\$240,000</u>
Total Normal Cost	\$5,354,246	\$5,892,046
% of Pay	11.5%	11.7%
Employee Contributions	\$4,120,037	\$4,479,767
% of Pay	8.8%	8.9%
Employer Normal Cost	\$1,234,209	\$1,412,279
% of Pay	2.6%	2.8%

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Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

Table II		
	<u>January 1, 2018</u>	January 1, 2020
Actives		
Superannuations	\$120,922,487	\$139,343,878
Termination	(3,181,876)	(3,269,024)
Death	3,161,411	1,977,562
Disability	4,428,042	4,942,917
Retirees and Inactives		
Retirees and Beneficiaries	\$144,109,751	\$169,844,125
Terminated (Refund)	1,565,170	1,396,198
Disabled	18,290,038	19,990,252
Total	\$289,295,023	\$334,225,908

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Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

Tab	le III	
	January 1, 2018	January 1, 2020
Actives		
Superannuation	\$138,933,111	\$160,012,928
Termination	6,425,259	6,951,895
Death	4,925,863	3,223,965
Disability	8,478,658	9,405,308
Retirees and Inactives		
Retirees and Beneficiaries	\$144,109,751	\$169,844,125
Terminated (Refund)	1,565,170	1,396,198
Disabled	18,290,038	19,990,252
Total	\$322,727,850	\$370,824,671

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Funded Status and Appropriations:

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV								
	<u>January 1, 2018</u>	January 1, 2020						
Cash equivalents	\$639,963	\$846,634						
Fixed income securities	0	0						
Equities	0	0						
International	0	0						
Real Estate	0	0						
Other	0	0						
PRIT Fund	150,966,326	164,151,396						
Accounts receivable	4,585,396	4,602,881						
Accounts payable	(1,551)	0						
Accrued income	$\underline{0}$	<u>0</u>						
Total Market Value	\$156,190,134	\$169,600,911						
Total Actuarial Value	\$151,232,387	\$164,889,315						

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Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (7.75%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a four year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 20%. The calculation of the actuarial value of assets as of January 1, 2020 is presented in Table V.

Table V

		January 1, 2020
(1)	Market value at January 1, 2019	\$149,775,429
(2)	2019 Contributions	\$18,666,228
(3)	2019 Payments	(\$21,952,951)
(4)	Net interest adjustment at 7.75% on (1), (2), and (3) to December 31, 2019	\$11,480,235
(5)	Expected market value on January 1, 2020	\$157,968,941
	(1) + (2) + (3) + (4)	
(6)	Actual market value on January 1, 2020	\$169,600,911
(7)	2019 (Gain) / Loss	(\$11,631,970)
(8)	80% of 2019 (Gain) / Loss	(\$9,305,576)
(9)	2018 (Gain) / Loss	\$15,400,831
(10)	60% of 2018 (Gain) / Loss	\$9,240,499
(11)	2017 (Gain) / Loss	(\$11,945,005)
(12)	40% of 2017 (Gain) / Loss	(\$4,778,002)
(13)	2016 (Gain) / Loss	\$657,416
(14)	20% of 2016 (Gain) / Loss	\$131,483
(15)	Actuarial value on January 1, 2020, $(6) + (8) + (10) + (12) + (14)$	
	but not less than 80% nor greater than 120% of (6)	\$164,889,315
(16)	Ratio of actuarial value to market value	97.22%
(17)	Actuarial Value Return for 2018	5.98%
(18)	Actuarial Value Return for 2019	7.07%
(19)	Market Value Return for 2018	-2.21%
(20)	Market Value Return for 2019	15.60%

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Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

Table	VI	
	<u>January 1, 2018</u>	January 1, 2020
Actuarial Accrued Liability	\$289,295,023	\$334,225,908
Actuarial Assets	<u>151,232,387</u>	164,889,315
Unfunded Actuarial Accrued Liability	\$138,062,636	\$169,336,593
Funded Status	52.3%	49.3%

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Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2036 \$ 168,327,488 over 16 years with 4.0% increasing payments
- Increasing amortization of the Early Retirement Incentive by June 30, 2028 \$1,009,105 over 8 years with 2.5% increasing payments
- Interest adjustment for payments contributed quarterly over fiscal year.

The Board voted to adopt a funding schedule that increases 8% per year until it matches the description above. The pension appropriation is shown in Table VII.

Table VII		
	<u>January 1, 2018</u>	January 1, 2020
Normal cost	\$1,174,823	\$1,412,279
Amortization payment of the accrued liability	9,295,962	13,540,667
Amortization payment of ERI liability	<u>135,219</u>	149,256
Total cost	\$10,606,004	\$15,102,202
% of Pay	24.9%	30.0%
Fiscal 2021 cost	\$13,171,069	\$13,171,069
Fiscal 2022 cost	13,648,821	\$14,224,754

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 4.0% per year. The employee contribution rate is expected to increase to 10.5% by 2037 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 15 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 30% of payroll until the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 1% thereafter. The decrease in the cost as a percentage of payroll is a result of the increase in member deductions.

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Appropriation Forecast

Fiscal		Employer	Amortization	Employer	Employer		
Year	Employee	Normal Cost	Payments	Total Cost	Total Cost	Unfunded	Funded
Ending	Contribution	with Interest	with Interest	with Interest	% of Payroll	Liability	Ratio %**
2021	\$4,479,767	\$1,507,270	\$11,663,799	\$13,171,069	26.2	\$172,283,514	48.5
2022	4,733,872	1,519,049	12,705,705	14,224,754	27.1	170,884,594	52.8
2023	5,001,775	1,528,837	13,833,898	15,362,735	28.0	171,469,435	56.2
2024	5,284,204	1,536,429	15,055,324	16,591,753	28.9	170,925,075	58.3
2025	5,581,922	1,541,608	16,377,486	17,919,094	29.9	169,065,180	60.7
2026	5,895,734	1,544,142	17,808,479	19,352,621	30.9	165,680,962	63.2
2027	6,226,486	1,543,783	19,357,048	20,900,831	31.9	160,538,790	65.9
2028	6,575,067	1,540,264	20,919,435	22,459,699	32.8	153,377,582	68.9
2029	6,942,412	1,533,302	21,559,286	23,092,588	32.3	144,027,889	72.0
2030	7,329,503	1,522,595	22,421,658	23,944,253	32.0	133,302,953	75.2
2031	7,737,373	1,507,820	23,318,524	24,826,344	31.8	120,871,351	78.5
2032	8,167,110	1,488,631	24,251,265	25,739,896	31.5	106,565,796	81.9
2033	8,619,856	1,464,662	25,221,315	26,685,977	31.3	90,204,637	85.4
2034	9,096,809	1,435,521	26,230,168	27,665,689	31.0	71,590,688	88.9
2035	9,599,234	1,400,792	27,279,375	28,680,167	30.8	50,509,965	92.5
2036	10,128,455	1,360,030	28,370,550	29,730,580	30.5	26,730,327	96.2
2037	10,685,868	1,312,762	0	1,312,762	1.3	(0)	100.0
2038	11,166,733	1,371,837	0	1,371,837	1.3	(0)	100.0
2039	11,669,236	1,433,569	0	1,433,569	1.3	(0)	100.0
2040	12,194,351	1,498,080	0	1,498,080	1.3	(0)	100.0
2041	12,743,097	1,565,494	0	1,565,494	1.3	(0)	100.0
2042	13,316,536	1,635,941	0	1,635,941	1.3	(0)	100.0
2043	13,915,780	1,709,558	0	1,709,558	1.3	(0)	100.0
2044	14,541,991	1,786,488	0	1,786,488	1.3	(0)	100.0
2045	15,196,380	1,866,880	0	1,866,880	1.3	(0)	100.0
2046	15,880,217	1,950,890	0	1,950,890	1.3	(0)	100.0
2047	16,594,827	2,038,680	0	2,038,680	1.3	(0)	100.0
2048	17,341,594	2,130,420	0	2,130,420	1.3	(0)	100.0
2049	18,121,966	2,226,289	0	2,226,289	1.3	(0)	100.0
2050	18,937,454	2,326,472	0	2,326,472	1.3	(0)	100.0
2051	19,789,640	2,431,164	0	2,431,164	1.3	(0)	100.0
2052	20,680,174	2,540,566	0	2,540,566	1.3	(0)	100.0

^{**} Beginning of Fiscal Year

EXHIBITS

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2020

Total	0 0	10 34,609	40 54,693	51 60,146	74 63,181	66 59,801	107 61,916	149 59,950	159 59,644	129 55,908	42 41,112	19 34,371	846 57,750
40+	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	1 101,623	0 0	0 0	1 101,623
35-39	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	4 71,910	8 91,690	1 50,750	1 86,632	14 82,753
30-34	0 0	0 0	0 0	0 0	0 0	0 0	0 0	12 95,014	21 93,490	20 70,905	2 43,207	4 35,590	59 80,514
25-29	0 0	0 0	0 0	0 0	0 0	0 0	9 79,401	19 90,256	26 85,087	7 76,786	5 45,131	$\frac{1}{50,078}$	67 81,417
20-24	0 0	0 0	0 0	0 0	0 0	6 72,590	27 88,428	23 78,969	14 60,148	8 41,711	8 49,163	1 57,428	87 72,021
15-19	0	0	0 0	0 0	6 79,434	18 69,670	14 70,696	16 57,380	23 40,629	28 49,695	10 34,344	6 21,405	121 53,192
10-14	0 0	0 0	0 0	3 81,372	27 77,326	11 69,454	11 72,592	17 45,706	25 53,110	22 50,551	8 44,049	2 42,200	126 59,906
5-9	0 0	0 0	12 56,296	21 68,585	18 60,842	11 56,821	16 44,918	22 42,195	30 42,888	16 49,224	2 24,797	2 27,374	150 51,077
Average Salary <5	0	10 34,609	28 54,006	27 51,225	23 44,168	20 43,414	30 33,864	40 40,946	16 39,334	19 41,925	6 37,528	0 0	221 42,671
Attained Age	< 20	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	69-59	70+	Total Employees Average Salary

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Exhibit 2 - Retiree Distribution as of January 1, 2020

	Number	of Employe	ees	Tota	l Payments	
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	0	0	0	0	0
45-49	1	0	1	72,727	0	72,727
50-54	0	3	3	0	30,612	30,612
55-59	13	20	33	266,156	1,121,961	1,388,116
60-64	22	38	60	370,803	1,754,969	2,125,772
65-69	67	60	127	1,444,897	2,267,622 3,712,51	3,712,518
70-74	65	62	127	1,133,712	2,468,437	3,602,149
75-79	65	56	121	1,180,548	1,772,331	2,952,879
80-84	75	30	105	1,202,151	975,245	2,177,396
85-89	44	24	68	631,145	692,577	1,323,721
90-94	44	10	54	683,761	237,786	921,547
95+	9	3	12	104,432	48,570	153,002
otal	405	306	711	7,090,331	11,370,108	18,460,439
verage (Age/Payment)	77.59	73.09	75.65	17,507	37,157	25,964
equency Percent	57.0	43.0	100	38.4	61.6	100

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Exhibit 3 - Disabled Retiree Distribution as of January 1, 2020

	Number	of Employ	ees	Total	Payments	
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	1	0	1	63,480	0	63,480
45-49	0	1	1	0	48,055	48,055
50-54	0	2	2	0	115,114	115,114
55-59	2	2	4	23,361	70,309	93,670
60-64	0	9	9	0	383,319	383,319
65-69	3	7	10	63,030	290,193	353,223
70-74	3	7	10	71,718 242,	242,823	314,542
75-79	0	9	9		236,076	
80-84	2	7	9	38,388	232,176	270,564
85-89	1	3	4	6,110	119,273	125,383
90-94	1	0	1	16,006	0	16,006
95-99	1	0	1	21,329	0	21,329
tal	14	47	61	303,421	1,737,340	2,040,761
verage (Age/Payment)	72.9	71.28	71.65	21,673	36,965	33,455
equency Percent	23.0	77.0	100	14.9	85.1	100

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EXHIBIT 4 - CASH FLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net change in plan assets
2020	\$3,847,097	\$4,479,767	\$13,171,069	\$15,594,379	\$29,398,117
2021	5,356,975	4,733,872	14,224,754	14,689,402	28,291,053
2022	17,085,267	5,001,775	15,362,735	16,490,996	19,770,238
2023	18,266,360	5,284,204	16,591,753	18,039,449	21,649,046
2024	19,621,613	5,581,922	17,919,094	19,733,578	23,612,980
2025	20,943,162	5,895,734	19,352,621	21,588,479	25,893,673
2026	22,070,940	6,226,486	20,900,831	23,635,431	28,691,807
2027	23,227,817	6,575,067	22,459,699	25,897,983	31,704,932
2028	24,307,491	6,942,412	23,092,588	28,337,417	34,064,927
2029	25,343,881	7,329,503	23,944,253	30,964,498	36,894,373
2030	26,239,930	7,737,373	24,826,344	33,817,549	40,141,336
2031	27,045,767	8,167,110	25,739,896	36,927,090	43,788,329
2032	27,733,680	8,619,856	26,685,977	40,325,249	47,897,403
2033	28,247,682	9,096,809	27,665,689	44,050,041	52,564,857
2034	28,724,159	9,599,234	28,680,167	48,139,633	57,694,875
2035	40,640,961	10,128,455	29,730,580	52,193,490	51,411,563
2036	39,475,543	10,685,868	1,312,762	55,811,052	28,334,139
2037	39,437,325	11,166,733	1,371,837	58,022,700	31,123,945
2038	39,287,153	11,669,236	1,433,569	60,455,459	34,271,111
2039	39,038,406	12,194,351	1,498,080	63,136,544	37,790,570
2040	38,658,516	12,743,097	1,565,494	66,096,077	41,746,152
2041	38,181,388	13,316,536	1,635,941	69,366,600	46,137,690
2042	37,578,922	13,915,780	1,709,558	72,983,001	51,029,418
2043	36,858,278	14,541,991	1,786,488	76,983,807	56,454,008
2044	36,046,129	15,196,380	1,866,880	81,409,335	62,426,467
2045	35,109,925	15,880,217	1,950,890	86,303,322	69,024,504
2046	34,084,015	16,594,827	2,038,680	91,712,984	76,262,475
2047	32,969,982	17,341,594	2,130,420	97,687,896	84,189,928
2048	31,769,172	18,121,966	2,226,289	104,281,484	92,860,568
2049	32,835,460	18,937,454	2,326,472	111,461,881	99,890,347

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2020, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

- (i) Group 1: Most general employees in State and local government
- (ii) Group 2: Certain specified hazardous duty positions
- (iii) Group 3: State police officers and inspectors
- (iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. Salary

Salary is defined as gross regular compensation. Salary <u>does not</u> include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. Member Contributions

Member contributions vary depending upon date hired as follows:

Date of Hire	Member <u>Contribution Rate</u>	
Prior to 1975	5.0% of Salary	
1975 to 1983	7.0% of Salary	
1984 to 1996	8.0% of Salary	
1996 and Later plus	9.0% of Salary	
1979 and Later	2.0% of Salary in excess of \$	30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. Average Salary

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. <u>Creditable Service</u>

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. Service Retirement

a. Eligibility:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

- (i) completion of 20 years of service, if hired before April 2, 2012
- (ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member
- (iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service
- (iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

Age at	Perce	ntage of Average	Salary
Retirement	Group 1	Group 2	Group 4
	005	025	00.5
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
54	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.002	.001	.002
Т1	.001	.001	.001

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

Age at	Percei	ntage of Average	Salary
Retirement	Group 1	Group 2	Group 4
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60			
	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at	Percei	ntage of Average	Salary
Retirement	Group 1	Group 2	Group 4
67 or Over	.02500	.02500	.02500
66	.02375	.02500	.02500
65	.02250	.02500	.02500
64	.02125	.02500	.02500
63	.02000	.02500	.02500
62	.01875	.02500	.02500
61	.01750	.02375	.02500
60	.01625	.02250	.02500
59		.02125	.02500
58		.02000	.02500
57		.01875	.02500
56		.01750	.02375
55		.01625	.02250
54			.02125
53			.02000
52			.01875
51			.01750
50			.01625

8. <u>Deferred Vested Retirement</u>

a. Eligibility:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions with interest.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus \$450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. <u>Eligibility</u>:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of \$250 per month to the surviving spouse, plus \$120 for the first child, plus \$90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of \$250 per month plus \$120 for the first child and \$90 for each additional child.

c. <u>Refund of Contributions</u>:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. <u>Cost-of-Living Increases</u>

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is \$15,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

- (i) Option A Life annuity
- (ii) Option B Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member
- (iii) Option C Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 6 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

1. Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. Valuation Date

January 1, 2020.

3. Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.75% per annum.

5. Salary Scale

It is assumed that salaries including longevity will increase at a rate of 3.0% per year.

6. <u>Cost-of-Living Increases</u>

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and \$15,000 per year.

7. Value of Investments

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined

using a five-year smoothing of asset returns greater than or less than the assumed rate of return.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

<u>Service</u>	General <u>Employees</u>	Police and Fire Employees
0	0.2080	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
30	0.0000	0.0000

9. Annual Rate of Mortality

It is assumed that mortality for is represented by the various SOA Pub-2010 Public Retirement Plans Mortality Tables specific to the Group, Pre-retirement versus Post, Disabled and Beneficiaries, with Scale MP-2019 improvements until 2025.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

	Male	Female	Male and Female
	General	General	Police and Fire
<u>Age</u>	Employees	Employees	Employees
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.00000
66	0.2682	0.1959	1.00000
67	0.2500	0.2000	1.00000
68	0.2500	0.2000	1.00000
69	0.2500	0.2000	1.00000
70 to 76	0.2500	0.2500	1.00000
77 to 79	0.3500	0.2500	1.00000
80	1.0000	1.0000	1.00000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

	Male General	Female General	Male and Female Police and Fire
<u>Age</u>	Employees	Employees	Employees
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	0.2500
66	0.1224	0.1038	0.3000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70	0.2615	0.1939	1.0000
70 to 76	0.2682	0.1959	1.0000
77 to 79	0.2500	0.2000	1.0000
80	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained <u>Age</u>	General Employees	Police and Fire Employees
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 20% of all disabilities are ordinary (80% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2020 is \$240,000 and is anticipated to increase at 4.5% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. Actuarial Accrued Liability

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

3. Actuarial Cost Method

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. Actuarial Present Value

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. Forecast

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

6. Normal Cost

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

7. Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

8. Valuation Method

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

9. Vested Liability

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

CERTIFICATION:

This report fairly represents the actuarial position of the Peabody Retirement System contributing as of January 1, 2020, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC

Daniel W. Therman

Daniel W. Sherman, ASA, MAAA

June, 2020

BREAKOUTS

Breakouts

	<u>Total</u>	City	Light	Housing <u>Authority</u>	Water	Sewer	Hospital	Brooksby <u>Farm</u>	Skating <u>Rink</u>	Golf <u>Course</u>
(1) Payroll of Active Participants Pecentage of Total Payroll	\$50,322,230 100.00%	\$41,116,086 81.71%	\$5,870,021 11.67%	\$1,197,795 2.38%	\$1,229,069 2.44%	\$105,663 0.21%	%00 [°] 000.0	\$200,210 0.40%	\$267,873 0.53%	\$335,514 0.67%
(2) Actuarial Accrued Liability	\$334,225,908	\$263,146,241	\$45,014,381	\$8,626,896	\$6,655,464	\$1,376,792	\$6,843,626	\$499,174	\$945,460	\$1,117,874
(3) Assets	\$164,889,315	\$129,822,382	\$22,207,705	\$4,256,052	\$3,283,453	\$679,236	\$3,376,282	\$246,266	\$466,440	\$551,500
(4) Unfunded Actuarial Accrued Liability	\$169,336,593	\$133,323,859	\$22,806,676	\$4,370,844	\$3,372,011	\$697,556	\$3,467,344	\$252,908	\$479,020	\$566,374
(5) Total Employer Contributions(a) ERI	\$149,256	888,098	\$34,061	\$9,048	\$5,724	\$12,325	0\$	80	0\$	80
(b) Remaining Amortizations	14,712,946	11,583,947	1,981,576	379,764	292,980	80,608	301,263	21,974	41,620	49,210
(c) Employer Normal Cost	1,172,279	1,027,188	118,099	(13,869)	17,017	4,729	1	1,432	9,380	8,301
(d) Administrative Expenses	240,000	196,094	27,996	5,712	5,861	504	0	955	1,277	1,601
(e) Total Appropriation	\$16,274,481	\$12,895,327	\$2,161,732	\$380,655	\$321,582	\$78,166	\$301,263	\$24,361	\$52,277	\$59,112
Percent of Total Appropriation	100.00%	79.24%	13.28%	2.34%	1.98%	0.48%	1.85%	0.15%	0.32%	0.36%
(6) Fiscal 2021 Appropriation	\$13,171,069	\$9,564,225	\$1,602,956	\$267,565	\$273,646	\$75,405	\$297,970	\$14,594	\$29,189	\$36,486
Percent of Total Appropriation	100.00%	78.64%	13.18%	2.20%	2.25%	0.62%	2.45%	0.12%	0.24%	0.30%
(7) Fiscal 2022 Appropriation	\$14,224,754	\$11,271,185	\$1,889,474	\$332,717	\$281,081	\$68,321	\$263,314	\$21,294	\$45,690	\$51,664
Percent of Total Appropriation	100.00%	79.24%	13.28%	2.34%	1.98%	0.48%	1.85%	0.15%	0.32%	0.36%
(8) Fiscal 2023 Appropriation Percent of Total Appropriation	\$15,362,735 100.00%	\$12,172,880 79.24%	\$2,040,632 13.28%	\$359,334 2.34%	\$303,568 1.98%	\$73,787 0.48%	\$284,380 1.85%	\$22,998 0.15%	\$49,345 0.32%	\$55,797 0.36%